(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 September 2001 (27.09.2001)

PCT

(10) International Publication Number
WO 01/72062 A1

(51) International Patent Classification[7]: H04Q 7/22, H04L 12/28, 29/06, 12/56

(21) International Application Number: PCT/GB01/01237

(22) International Filing Date: 21 March 2001 (21.03.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

0006678.7	21 March 2000 (21.03.2000)	GB
0017818.6	21 July 2000 (21.07.2000)	GB
0018207.1	26 July 2000 (26.07.2000)	GB

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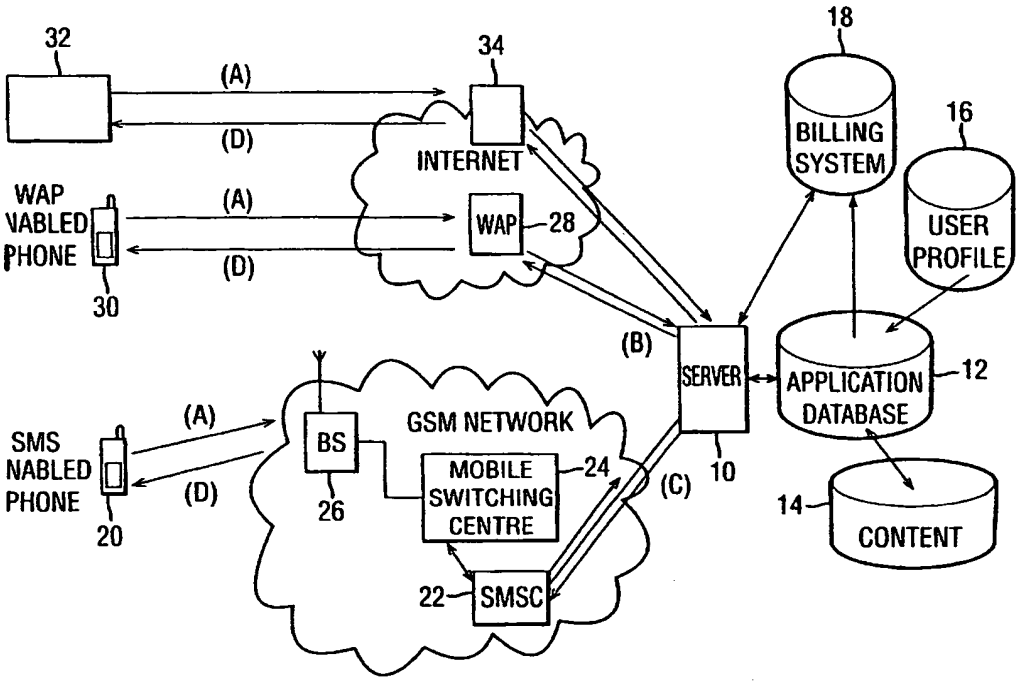
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR DELIVERING INFORMATION SERVICES



(57) Abstract: A method of delivering information services to portable terminals, for example cellular phones (20, 30), in which an information service provider (10) generates messages including commands. The messages are propagated as short message service packets or WAP packets to the terminals (20, 30). The terminals include clients which are able to parse the commands and use them to condition the terminal to process the message and, optionally, to generate a reply message.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

METHOD OF, AND MEANS FOR, DELIVERING INFORMATION SERVICES

The present invention relates to a method of, and means for, delivering information services over the air.

Information services between an internet server and a personal computer (PC) have existed for some years. Some of these services include information retrieval and business activities such as banking, insurance and electronic commerce, so called e-commerce. More recently there have been developments to enable the internet services to be available to users of portable telecommunications devices such as cellular telephones. For the most part these services have been the downloading of data for display on a display panel built into the device.

There is a growing demand for more internet services, such as user selectable subscription services, to be made available to user of portable telecommunications devices.

According to one aspect of the present invention there is provided a method of delivering information services to a user device having a client, including delivering the information services to the user device as message packets containing commands and the client parsing the commands and using them to condition the user device.

According to a second aspect of the present invention there is provided a user device for use in a system in which a packet message signal including commands is generated and propagated from an information service provider to the user device, the user device including means for receiving the packet message signal and a client having means for extracting the commands from the packet message signal, means for parsing commands present in the packet message signal and means for conditioning the user device in response to the parsed commands.

According to a third aspect of the present invention there is provided an information message delivery system including an information providing means for generating packet message signals including commands, packet message signal propagating means coupled to the information providing means, and a user device according to the second aspect of the invention.

According to a fourth aspect of the present invention there is provided a packet message signal generated by way of an information service provider, the signal including commands for use by a client in a receiving user device for conditioning the user device.

According to a fifth aspect of the present invention there is provided a method of delivering media information to a plurality of subscribing handsets, comprising transmitting the media information as a stream of encrypted messages, receiving the media information,

decrypting the encrypted messages and storing them for subsequent display.

According to a sixth aspect of the present invention there is provided an information delivery system comprising an information server coupled to at least one information content provider and to a message transmission means for transmitting information provided by the information server as a stream of encrypted messages, and a plurality of handsets, each handset including a client for decrypting the encrypted messages, a memory for storing the decrypted messages and a message display means.

According to a seventh aspect of the present invention there is provided a handset for use in an information delivery system in which information is transmitted as a stream of compressed and/or encoded and/or encrypted messages, the handset comprising means for receiving the stream of messages, a client for decrypting the encrypted messages, a memory for storing the decrypted messages and a message display means for displaying the information contained in a message.

According to an eighth aspect of the present invention there is provided a signal comprising repeating sequences of concatenated packets, the packets comprising encrypted media information and commands for use by receiving apparatus to condition it to process the media information.

The fifth to eighth aspects of the invention may be used in/with a method or system or user device according to any one of the first to third aspects of the invention.

Preferably the information services are delivered as Short Message Service (SMS) packet messages and the user device is an SMS enabled mobile phone. This has the advantage that SMS messages can be sent simultaneously with calls, this is not possible with voice data and fax calls which take over a dedicated radio channel for the duration of the call (SMS messages travel over and above the radio channel using the signalling path).

In a conventional SMS message packet the message text is contained in a user data field. The GSM allows a preamble to this text to be included in a user data header field preceding the user data field. Currently the user data header field is used only to facilitate concatenation of a series of SMS message packets, so as to allow users to send a message longer than 160 characters (the maximum allowed in the user data field of an SMS packet).

Preferably the commands are embedded in the above mentioned user data header.

Preferably each command contains information data which is to be played, displayed and/or stored by the user device and command data which determines whether the information data is to played, displayed or stored.

Preferably the information data is of one of the following: sound data (eg ringer tone for a mobile phone), graphic data, animation data, form data or menu data.

In the case of form or menu data the command data indicates to the client that a response is needed from the user of the user device and the client causes a menu or form to be displayed on the user device, prompting the user to select an option or enter data from/into the menu or form and when an option is selected/data is entered the client sends a message in reply to the information provider indicating which option was selected or communicating the data which was entered.

Preferably each command contains information type data indicating the type of information data (eg sound, graphic) contained in the command and the client detects which type of data is included in the command and sends it to an appropriate parser.

In another preferred aspect of the invention the information service provides a media event in the form of a plurality of information data types (eg graphic, animation, sound, menu) which are to be played/displayed simultaneously by the user device. Each type of information data (eg graphic, animation, sound, menu) is delivered to the user device in one or more commands included in one or more message packets and the information data is displayed/played simultaneously so as to create the media event.

This is an improvement over conventional SMS as it enables music, graphics and animations to be played back simultaneously on a mobile phone handset. The music, graphics and/or animation could be accompanied by a form asking the user if he/she wishes to join a subscriber service or buy a product and requesting details (eg credit card no, name address) if he/she does.

Preferably the media event is facilitated by an element of the command data which indicates to the client that the command contains information data which is to be part of a media event and that the command is to be executed simultaneously with other commands containing information data relating to the same media event.

Preferably the client is able to concatenate commands and format them into a message packet which can then be transmitted to other user devices. This enables "point to point transmission" so that eg a user who has received an SMS with embedded commands on his mobile phone is able to forward the SMS with embedded commands to another mobile phone.

Further preferred features can be found in the attached claims.

The present invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

Figure 1 is a diagram of an architecture of a service delivery model using various message delivery protocols,

Figure 2 is a simplified block schematic diagram of a mobile switching centre and base station and of a handset,

Figure 3 is a flow chart illustrating the processing of a short packet message signal by a client in a handset,

Figure 4 is a diagram of a client,

Figure 5 illustrates an encoding format for media information,

Figure 6 illustrates the GSM format of header information,

Figure 7 describes a data packet structure within an SMS message,

Figures 8A, 8B and 8C illustrate the command data flow in the client,

Figure 9 is a flow chart of a client passing a packet message signal and of a user responding to commands,

Figure 10 is a sketch illustrating a client embodied in a SIM card, and

Figure 11 is a sketch illustrating a plug-in client for use in a WAP enabled phone,

Figure 12 is a diagram illustrating the delivery of SMS packets of data to SMS phones,

Figure 13 is a timing diagram showing successive sequences of information packets,

Figure 14 is a diagram of a SMS-CB system,

Figure 15 is a diagram illustrating how a subscriber with a client can obtain subscriber service information.

In the drawings the same reference numerals have been used to indicate corresponding features.

Figure 1 shows a message delivery architecture which can be used to deliver messages. The message delivery architecture includes an internet based server 10 which is coupled by suitable links to an application data base 12 which in turn is coupled to a content store 14, a user profile store 16 and to a billing system 18 by which a user is charged for the services provided. The billing system 18 is also linked to the internet based server 10. Users can fall in several categories depending on the method of delivery of messages from the internet based server 10.

One category of delivery is by using a short message service (SMS) over the GSM network to an SMS enabled phone 20 which contains or has access to a "client", that is a software package capable of processing or parsing the SMS messages in a predetermined manner. More specifically the server 10 is coupled to a short message service centre (SMSC) 22 which in turn is coupled to a Mobile Switching Centre (MSC) 24 of the network. The MSC 24 is coupled to geographically distributed base station transceivers 26 which propagate/receive messages to/from the SMS enabled handset 20.

A second architecture is based on the messages from the server 10 being relayed to a Wireless Applications Protocol (WAP) server 28 which sends and receives WAP

messages to a WAP enabled handset 30 containing, or having access to, a client.

A third architecture is based on a PC 32 equipped with a client and a two way radio link to a web site 34 which is coupled to the server 10.

The various messages are indicated by the letters (A), (B), (C) and (D). Message (A) relates to the handset 20 or 30 or the PC 32 requesting delivery of a service through the SMSC 22, WAP server 28 or the website 34, respectively. Message (B) is passed to the server 10 which recognises a server enabled service. Message (C) denotes the server 10 despatching the requested service to the device with added features and embedded commands. Message (D) relates to the content/service being delivered by way of the SMS, WAP or WEB to the client device which creates the required enhanced end user experience.

Besides WAP and SMS message protocols other message protacols may be used such as USSD, GPRS (General Packet Radio System) and UMTS (Universal Mobile Telephone System).

For ease of description, the SMS protocol will be referred to generally in the following.

The SMS (Short Message Service) is defined within the GSM standard with the following characteristics:

A short message is sent to one mobile phone number by a server connected to the network or by an individual mobile phone user.

A single short message can be up to 160 characters of text in length (for languages that require UCS2 encoding the limit is 70 characters).

SMS is a store and forward service, in other words, short messages are not sent directly from sender to recipient, but always via an SMSC 22 instead. Each mobile telephone network that supports SMS has one or more messaging centers to handle and manage the short messages.

Short messages can be sent and received simultaneously with calls. This is possible because whereas voice, data and fax calls take over a dedicated radio channel for the duration of the call, short messages travel over and above the radio channel using the signalling path. As such, users of SMS rarely if ever have problems sending and receiving messages during peak network usage times. The most important applications of SMS are:

Person to person messaging - This is the simplest and most direct application of SMS. From the end user's point of view, SMS may be a valid alternative to a voice call in certain circumstances:

If the information to be communicated is short, sending a SMS is usually cheaper than making a voice call.

If the recipient is not available to answer a voice call, it is always possible to send him a SMS that he will read on his own time. In the same way, if the recipients phone is out of coverage, the SMS centre will store the SMS and send it when the phone is reachable again.

If the sender does not want to disturb bystanders in his or the recipient's vicinity then SMS is a quiet and convenient solution.

Notification of voice mail waiting - This is the most commonly used application today. An additional service option development is to translate the voice message to an SMS message and forward it to a user with an embedded number for redial. Some operators have extended this by offering an option to receive a notification when the customer receives email on his internet mailbox.

By embedding commands or triggers in the SMS messages, various operations can be made to happen automatically on a user device such as a phone. The embedded command within a SMS message can be encrypted messages sent by operators or service. The client in the user device causes the device and/or the user to interact with the service, for example, conducting an analysis of the operation of the device and reporting back automatically or causing the user to phone. They can also be used as entertaining ways of making something happen to make your message delivery more interesting.

By enhancing the basic SMS capability, users of the SMS find it more enjoyable and useful. On the other hand, operators see SMS enabled phones 20 as a way to boost SMS usage, thereby generating new revenue. GPRS also extends the life time of SMS type services if the same techniques are applied to the faster and larger delivery capacities of GPRS.

Figure 2 is a much simplified block schematic diagram of the GSM network as represented by the short message switching centre (SMSC) 22, the mobile switching centre 24 and the base station transceiver 26 and a SMS enabled phone 20.

A message received by the SMSC 22 on an input 40 is stored in a message store 42. A processor 44 determines the nature of the message and what commands, stored in a command store 46, should be included in the message to be formatted in a formatting stage 48. The formatted message with commands and an appended users address is encrypted in an encryption stage 50 and then channel coded in an encoding stage 52. The encoded SMS message is transferred by the mobile switching centre 24 to the base station transceiver 26 of the service area or cell in which the SMS enabled phone 20 is registered. The transceiver 26 transmits the SMS message as a downlink signal DNL. An up link SMS signal UPL from the phone 20 is received by the transceiver 26 and is routed by the mobile switching centre 24 to the SMSC 22. The signal is decoded in a decoding stage 54 and the decoded signal is decrypted in a decryption stage 56. The output from the

stage 56 is applied to a deformatting stage 58 and the recovered message is forwarded to an output 60.

The phone 20 comprises a transceiver 62 having an output coupled to a decoder 64 for decoding a received SMS message. The phone includes a client 66 which for convenience of illustration is shown as a series of stages but in reality the client 66 is a software package stored in a processor 78. The client 66 is disclosed in greater detail in Figure 4. The decoded signal is decrypted in a decryption stage 68 and its output is deformatted in a deformatting stage 70. A parsing stage 72 parses any commands present in the deformatting stage 70 and directs these on a line 74 to the processor 78. The message data, without the commands, is applied by a line 76 to the processor 78. The message data is stored in a RAM 80. The processor 78 operates in accordance with a program stored in a ROM 82 but any software changes to the stored program are stored in a patch ROM 84 which may be implemented as an EEPROM. In the case of the phone being a GSM phone, a SIM card 79 is operatively coupled to the processor 78.

A man/machine interface in the form of a keypad 86 is coupled to the processor 78. An LCD driver 88 has an input coupled to the processor 78 and an output coupled to a LCD panel 90. A ringer 91 is also coupled to the processor 78.

In the event of a phone user wanting to send an uplink message signal, the message is compiled and formatted in a stage 92 and its output is encrypted in a

stage 94. The encrypted signal is channel coded in an encoder 96 prior to being passed to the transceiver 62 for onward transmission as an upLink signal UPL.

Figure 3 illustrates the operations when the GSM network 22, 24, 26 sends a packet message to a SMS enabled phone 20 including an embedded client 66 on a downlink DNL and the phone 20 transmits a request or reply on an upLink UPL.

A sequence of operations will be described with reference to Figure 3. The block 100 denotes the handset receiving a message from the GSM network in accordance with say the SMS, USSD or GPRS protocol. The block 102 indicates the client carrying out a parse operation which includes recovering encrypted commands. The block 104 indicates the handset itself operating in accordance with the commands which may require the handset to generate a response which is sent as a short message.

If this is the case then block 106 relates to obtaining a result which in block 108 is formatted by the client for onward transmission by the relevant short message service such as SMS, USSD or GPRS.

Figure 4 illustrates in a broken 1ine box an example of the client software 66 which is operatively coupled to a GSM stack 62, a message RAM 80, ROMs 82, 84, a SIM card 79, a display driver and LCD screen 88, 90 and a ringer 91. The client software (or client) 66 is intended for use with byte stream data packet messages.

A point of connection between the software of the GSM stack 62 and the client proper is a TP-PDU (Tag Parser-Protocol Data Unit) encoder 132. The encoder 132 is a translation layer for translating TP-PDUs into the byte stream representation required by a byte stream parser 134. The parser 134 parses the byte stream and fills in a command structure (comprising a doubly linked list of command elements) for each time discrete operation (or series thereof) in the transcribed SMS byte stream. An operation in this context is a collection of events, which occur, or appear to occur, at the same time to the
user, for instance a play tone and an associated icon animation (referred to in the art as iconimation).

The byte stream parser 134 delegates parsing of text information containing a forms mark-up language to a character based or forms parser 136. The parser 136 parses a stream of text generating a command element structure for each discrete prompt, that is, a reply pair in the form object and passes the element back to the tag parser where it is embedded in a command structure.

The parser 134 is also coupled to an engine 138 which presents an external API (Application Programming Interface) to the mobile phone software for the generation of SMS that include embedded media. A more important role of the engine 138 is to manage a queue of operations for incoming byte streams from the internet server 10, when in a receive mode. Each element of this queue comprises a command structure. In the receive mode, the engine 138 is a very simple object which examines the

control bits of the individual command elements and moves them either to the display server 140 or to the persistence server 142. The engine 138 will respond to call-backs from the display server 140 or persistence server 142 indicating that the operation has terminated (successfully or unsuccessfully). These call-backs will pass back ownership of the command to the engine 138 which may then place them into a queue as a new operation (discarding any command elements with no control bits set).

The display server 140 and the persistence server 142 interface directly with OME APIs in order to write to devices on the phone or the SIM.

A memory manager 144 is coupled on the one hand to the TP-PDU encoder 132, byte stream parser 134 and the forms parser 136 and on the other hand to the system RAM 80. The memory manager 144 serves for managing a dynamic memory allocation heap. Where a heap does not exist, the memory manager 144 will support a simple queue based dynamic allocation from a contiguous area in the phone's RAM. In one embodiment the dynamics of memory allocation is essentially two-fold, an allocation phase followed by a release phase. Heap usage generally falls to zero between messages. The fact that the client is essentially stateless means that there is no heap holdover from one message to another. This allows the use of a simple allocation algorithm in a small memory space.

Figure 5 illustrates a main tag format for encoded media information received by the client 66. The format

comprises a repeating sequence of concatenated command elements EL 1, EL2. Each of these command elements comprises four fields, namely, a Tag byte 150, control bits 152 (at least 1 byte), a length of data field 154 which may be up to 4 bytes long and a data field 156. The Tag byte 150 can contain values from 0 to 255, giving 256 possible fundamental types of data, for example, text, graphics, banner (or logo) replacement, ring tone, sound and forms (used to manage the transfer of data between the phone and a service centre). The control byte(s) 152 includes various bit fields and flags for controlling how data is dealt with by the client. An example of the assignment of the respective bits is described as follows:

Bit 7 O -Operation toggle (a flag indicating the current operationO.

Bit 6 D - Display flag.
Bit 5 P - Persist flag.
Bit 4 R - Reply flag.
Bit 3 L1- Licence bit 1.
Bit 2 L2 -Licence bit 2.
Bit 1 LL1-Length of length field 1.
Bit 0 LL2-Length of length field 2.

Bit O -Operation toggle uses the concept of an operation to group events that must be simultaneous to the user, for example, the simultaneous playing of a ring tone with icon animation. Commands are grouped into operations using the operation toggle. This is a simple switched bit in an incoming byte stream.

Initially set O, it is reset for every element of a new operation structure. For instance a sequence as follows:

Byte stream = {O DPR 3210} + {O DPR 3210} + {1 DPR 3210} + {O DPR321 0}

would evaluate to an operation queue as follows:

Operation elements = {Command 1, Command 2} + {Command 3} + {Command 4}.

In each of the elements:

D - represents a display flag which indicates to the engine 138 (Figure 4) that the data block following is displayed on the phone 20 (Figure 1).

P - represents a persist flag which indicates to the engine 138 that the following block may be persisted upon the phone 20.

R - represents a reply flag which indicates to the client 66 that the following data block will invoke a SMS reply through the GSM stack 62 (Figure 4) to the MSC 24 (Figure 1).

L 1 and L2 - represent the licensing bits which allow tagging media as freely distributable, downloadable to a single phone or play and discard and so on. This licensing is mandated by the requirement for the client 66 to support point-to-point transmission of SMS containing embedded media.

LL 1 and LL2 - are 2 bits representing the length of the length field 154 in bytes. The indication of the length of the length field 154 itself can range from 1 to 4 bytes. The bits LL1 and LL2 indicate the length of the

following length field 154, for example [0,0] represents 1 byte ...[1,1] represents a 4 byte field which allows a maximum length of data field of 4.2 G bytes.

The data field depends on the fundamental data type indicated in the Tag byte 150.

The use of command context flags to control data flow in the client 66 is described below and an example of the various commands is given below.

On receipt of this byte stream, the client 66 moves along it examining the O bit of each tag byte for command element identifiers. It extracts linked command elements into a structure and adds this onto the engine's operation queue structure.

The tagged byte stream described above could arrive at the client 66 by any method, for instance it may just be a byte stream in a SMS body wlth an 8 bit user data coding stream. In an alternative arrangement the byte stream is embedded into the user-data-header field of a SMS.

A data field [up to 140 bytes] contains a number of characters indicated by the final field of the SMS header, the 1 byte user-data-length indicator (TP-UDL). These characters are encoded according to the user-data-coding scheme (TP-UDCS) field of the SMS header. Therefore, if the user data coding scheme 1s default (ASC1I; 7 bit packed losing the most significant bit) 160 characters may be encoded in the user data area of 140

bytes. Accordingly the value of the TP-UDL field will alter if the data-coding scheme is 8 bit or UCS-2 (Unicode) to a maximum of 140 or 70 characters, respectively.

The GSM specification also allows some preamble to precede the text of the message, in the user data field, in the form of a user-data-header field. This field is present if an indicator bit is set in the SMS header (TP-UDHI). Figure 6 shows the general structure of the user data field of a GSM SMS message. This field is present if an indicator bit is set in the SMS header (TPUDHI) irrespective of the data coding scheme for the appended text, these fields are always considered as octets (bytes).

Referring to Figure 6, the general structure of the user data field comprises in sequence a user data length indicator 160, and a user data area of TP-PDU consisting of a user data header length indicator 162, a user data header element 1 identifier 164, a user data header element 1 length 166, user data header element 1 data 168, a user data header element 2 identifier 170, a user data header element 2 length 172, user data header element 2 data 174 and user data (plain text) 176. As indicated in Figure 6, the user data area of TP-POU is a maximum of 140 bytes.

The SMS client software overview shown in Figure 7 illustrates the currently supported user-data-header identifier in use which is 0x00 and indicates a user-data-header of 4 bytes for SMS concatenation. It is

proposed to use a reserved value (OxFF) for the command element identifiers. In such a scheme, a 1-byte length block, as indicated in Figure 7 represents the length of a data block in a single TP-PDU (in bytes). Any plain (alternatively referred to as vanilla) text is appended to the end of the SMS. Data always follows the concatenation tag (Ox00).

The overview shown in Figure 7 comprises a user data header length indicator 180 of 1 byte, which indicator is concatenated with SMS 182 of 5 bytes. A command element identifier OxFF 184 is concatenated with a length of data indicator 186 which comprises 1 byte. A data byte stream 188 is concatenated with the indicator 186. A user data field 190 which includes vanilla text concludes the overview.

Figures 8A, 88 and 8C illustrate three stages in the command data flow in the client 66 when in the receive mode. The number of actions contemplated using the client 66 is quite small, namely Display it, Save it and Reply to it (or DPR) and this enables the flow logic of the client to be kept as simple as possible.

Figures 8A, 8B and 8C comprise an upper section which represents the engine domain ED and a lower section which represents the server domain SD.

Referring to Figure 8A, an engine command queue is present on an input 192 which for convenience of illustration is coupled to a command module 194 of the engine 138 (Figure 4). The command module 194 examines

the "ODPR" structure which for convenience is 0111 and despatches the structure to whichever device handles the highest priority request. As the "D" bit is set, the command module despatches a structure to the display server 140. On completion the server 140 sets the "D" bit to "0" so that the ODPR structure is now 0011 which is returned to the engine domain EO by way of a call-back function from where it is returned to the queue on the input 192 of the command module 194. As the P bit is set, the command is despatched to the persistence server 142. Upon completion the server 142 sets the "P" bit to "0" so that the ODPR structure is now 0001 which is returned to the engine domain EO by way of a call-back function from where it is returned to the queue on the input 192 of the command module 194. As the R bit is set; the command is despatched to the GSM stack 62 for a reply transmission. Upon completion, the "P" bit is set to "0" so that the ODPR structure is now "0000". The engine domain EO sees that the D, P and R bits are all zero and determines that it has finished handling the command and applies an input signal to a command erase module 196 which terminates the command flow.

In an alternative embodiment, instead of using byte stream data, the service provider creates the commands which may be included in the packet message to the handset. By way of example only, a set of embedded commands are as follows. The client 66 in the phone 20 parses the packet message to obtain the desired result. The commands are recognised by a coding scheme within the message and may include:-

/F 22 Set Font size for text e.g ABC→ABC

/R x	Repeat next operation e.g.Beep → Beep.Beep.Beep
/S	GSM number Set Handset SMSC (Short message service centre) number, required to send packet.
/E	Enable Feature (handset dependent)
/D&&&&	Perform handset dependent test/diagnostic check
/Cx	Set Channel For Cell Broadcast,
/M	Define handset menu & application e.g. "Server"
	Choice 1 → Command 1
	Choice 2 → Command 2
	Choice 3 → Command 3
	Choice 4 → Command 4
	etc
/U	Prepare for remote upgrade of handset firmware
/F	Apply Firmwave Fix
/I	Insert data record toAgenda/AddresslTodo Alarm e.g. 00103/13;meeting with client to set appointment on handset
/SCR -	Load stand by screen to handset

An example of an interactive command is to ensure that a new handset or phone 20 on the network is registered with the internet service provider and/or network operator for say warranty reasons. In order to register the handset various items of information need to be obtained, such as the user's name, the user's address, handset manufacturer, model type and serial number. The interactive commands can be related to the handset display or form showing various fields into which the

information is entered field by field. Once all the fields have been completed, the user is asked to confirm that the information is correct. If this is done then the client composes a message packet which is relayed via a short message service to the service provider. Figure 9 illustrates the steps involved. Block 110 denotes the client embedded in the new handset parsing the received registration packet message. Block 112 denotes the various interactive actions by the user and block 114 denotes the client preparing the response message as a form which is transmitted as a packet.

An example of the value of the service provider knowing details of the handset is that if the user believes that the handset is malfunctioning, the user notifies the service provider. In response the service provider can determine the handset model and is able to send a diagnostic message, which may comprise concatenated SMS messages, to the handset. The client in response to the commands in the diagnostic message automatically checks various features of the handset and enters the answers into a reply packet message which is sent back to the service provider for analysis. If as a result of the analysis it is determined that faults are present which can be corrected by modifying the software then further messages are sent to the handset.

A convenient method for handling software changes is for the handset's processor to include a patch ROM in the form of an EEPROM as a separate memory or as a dedicated part of the main memory which may otherwise be a flash memory. In operation the handset's processor has to check

the patch ROM before proceeding from one step to the next just in case the software has been modified.

In the case of a handset not having a patch ROM or an equivalent area in the main memory, the client may just carry out a "yes/no" check and relay the results as a packet message.

In another example, the user of a handset may wish to take advantage of a service offered by the service provider such as enabling the user to make a lottery entry. In such a case the message packet sent by the service provider includes a command whereby the client creates a field in the displayed form for the user to enter his/her lottery numbers, for example six 2 digit numbers and perhaps another field for a "lucky dip" entry. Once all the fields have been confirmed, the client formats the form as a SMS packet message which is transmitted to the service provider. The service provider then contacts the lottery operator by say e-mail and the entry is made. Payment can be done monthly or by the user entering his credit card or cash card number.

Other applications of this type of message include buying tickets for the theatre or other events and making reservations. Once the user has indicated the nature of his request. the commands in the packet message are tailored accordingly.

Another application of sending over the air commands to a client in a handset or other terminal is in the provision of subscription services. Since cellular

telephone systems such as GSM have a cellular structure with each cell having at least one base station, it is possible to focus information such as local news, road conditions and advertising to subscribers in a cell, groups of cells or in a special case nationally. The subscribing handsets will have to have a client which is enabled and the information is transmitted as encrypted point to multipoint packet signals. In the case of a non-subscribing handset receiving the encrypted packet, it will simply store/discard the message packet as it is unable to decrypt it.

More particularly there exists SMS-CB system which has provision for 90 channels some of which are dedicated to certain services. However an internet server being allocated a channel for its own use can transmit a continuous subscription service message comprising repeating sequences of concatenated packets, each packet in a sequence being allocated to a particular topic such as sport, weather, stock exchange prices and so on. One way of offsetting the cost of subscription services would be to provide advertising which would be carried as one packet in each of the repeating sequences. Thus a subscriber having an enabled client would periodically receive advertisements in a manner similar to UK commercial television. A similar principle may be used to carry local news, local road traffic information or for emergency messages.

Another form of providing a subscription service is shown in Figure 15. A subscribing handset has a number of key words downloaded to it in a packet message from

the service provider. These key words such as "sport", "weather", "shares", are held by the enabled client in the handset 50. When the subscriber wants to determine uptodate sports information, the word "sport" is entered either using a man-machine interface (MMI) or using voice recognition and a message packet is relayed to the service provider 52. The service provider which has entered a contractual arrangement with various dedicated web based information providers 54A, 54B, 54C passes the word "sport" and redirects the request to the selected web based information provider 54B using the information provider's URL.

The information provider 54B directly interacts with the subscriber 50 who selects the type of sport and is supplied with the desired information.

Billing of the subscriber may be by the web based information provider 54B invoicing the internet server 52 which composes a monthly bill for all the services provided during the preceding month and submits it to the subscriber.

An alternative method of billing is for the subscriber to having the costs of the usage of the subscription services added automatically to his/her telephone bill. A technique for doing this can be based on the use of premium rate telephone lines. The subscriber 50 initially contacts the internet server 52 on what in the UK is a free 0800 number. The service provider 52 on determining that the subscriber wants a subscription service re-routes the call to the web based

information provider 54B as a premium rate 0870 number and the information is supplied to the subscriber 50 at the premium rate. At termination of the call, the subscriber is returned to an 0800 number. The subscriber receives a telephone bill and remits the cost to the network provider (or telephone company) which in turn pays the internet server 52.

Another way of supplying subscription services is for the internet server to respond to a subscription service request by sending a message packet to the client in the subscriber's handset which causes a main menu to be displayed. The subscriber having selected the service, say "horoscopes", is then presented with a first submenu of the different signs. The subscriber selects the desired sign and the horoscope is displayed. This interaction may require an exchange of message packets between the internet server and the subscriber.

The description up to now has assumed that the client 66 is embedded in the handset 20 at the time of manufacture or subsequently. However a handset may not have the memory capacity to store the client. Figure 10 shows as an alternative, the client 66 stored on the SIM card 79 which when present in the handset enables it to receive packet messages and decrypt and parse the commands using an extension of the SIM Toolkit concept which is already present in the handset for use in the GSM system.

In the case of a subscriber unit, such as the WAP enabled phone 30 (Figure 1), being required to operate as

a WAP/WEB browser, then the client 66 can be implemented as a plug-in element 118 or 120 as shown in Figure 11. If necessary the client is delivered to a WAP browser on a WAP enabled handset via the internet.

In another variant the subscriber unit comprises a television receiver capable of receiving teletext information. By embedding a client in the television receiver and associating it with a specific page or pages then information can be related by the internet server parsing the information to include commands. The parsed information is related to the teletext centre for inclusion on a specific page and the parsed information is transmitted in the same manner as other text signals. By doing this it is possible for the internet server to target e-mail messages, short messages and embedded messages to the client which are transposed on the screen of the television receiver.

In the case of a subscriber wanting to store say diary information at the internet server then one method by which this may be done is for the internet server to transmit a message packed to the client which displays say time, days, dates (day, month, year) as a series of lines of respective indicia which are scrolled in a horizontal direction. A user selects time by highlighting a time in the time line and the highlighted time is loaded by the client into a slot in a packet message being compiled. The user then selects the day by highlighting the relevant day and this too is loaded into the packet message. This cycle is repeated for the other items and when the packet is complete the subscriber is

asked to confirm that it is correct. The packet message is then related to the internet server and the required diary entry is stored. Optionally the internet server can generate an alert to be relayed to the handset where say a distinctive ringing sequence is generated by the client.

A method of purchasing or searching service data bases such as timetables is for a subscriber to be able to send a voice message which is recognised by a simplified integrated voice recognition system in the internet server and causes the item or service to be selected. A decision tree may be relayed as a message packet for the client to display on the handset. The subscriber can then navigate through the decision tree and the results are relayed to the internet server.

Other facilities which can be implemented include:

(a) SMS melody attachment: With this feature the user can send a melody description via SMS. The melody can be saved and used as a ringer for signalling calls. it can also be sent again to another user via SMS. The melody can be created through the phone's user interface, or on a dedicated web site that sends it to the phone via SMS. This enables a user to personalise a phone because as mobile phone penetration increases, unique ringers to help determine just whose phone is ringing will become increasingly popular. In a variant of having a user created melody, the internet server may offer a series of ringers such as the top 10 charts on a weekly basis which can be downloaded so that the user receives the latest record theme.

(b) SMS image attachment - This feature is a logical extension of the Emotion Icons concept pioneered with "Savvy" Registered Trade Mark, a cellular telephone manufactured by Philips Consumer Communications. Thanks to images, the user can get, while writing, some of the informality of the spoken communication. This is not only fun and nice, but also helpful to have a correct communication. As a lot of people have experienced, brief, hastily written email can be misinterpreted and cause all sorts of trouble. Images can alleviate this because they convey feelings more easily than text ("an image is worth a thousand words"). This is evidenced by the popularity of Internet "smileys", emotion symbols such as :-) or :-(invented by email users in order to soften the impact of text. For SMS image attachments purposes, images can be found in a library on a dedicated server site that sends it to the handset via SMS. The site can also host an Icon authoring software package so that the user can design his own unique images. Images which are downloaded in this method can be used as screen savers for the mobile phone.

(c) SMS Animated image: By compressing a number of images, say 3 images, within an SMS message or EMS it is possible to create an animated image such as a bunch of flowers which opens from one image to the next in association with a message 'Happy Birthday'. It may be necessary to apply what is termed SMS message concatenation. Animating images means that the 160 character limit (70 for languages that require UCS2 encoding such as Chinese, Russian or Hebrew) for a SMS message is exceeded and the long message has to be split

into several short messages, which are reassembled by the phone upon reception. Concatenated SMS is a key enabler for small games and applets to be down loaded into the handset in addition to down loading email messages and longer documents including images necessary in richer applications.

(d) SMS-CB (Cell Broadcast) is designed for simultaneous delivery of messages to multiple users in a specified area. Whereas SMS is a one-to-one service, Cell Broadcast is one-to-many (or point to multipoint). It enables messages to be communicated to multiple mobile phone customers who are located within a given part of its network coverage area at the time the message is broadcast. Cell Broadcast is more akin to other mass distribution media such as teletext or Radio Data System (RDS). A SMS-CB message can contain up to 93 characters.

Services based on SMS-CB include: Advertising - Retail outlets in certain areas would be interested in sending customers and potential customers information such as sales, special offers, extended opening times and so on. Shopping centers, exhibition halls, airports and sports stadiums are the kinds of location that could be targeted for Cell Broadcast based services.

SMS-CB is ideal for delivering local or regional information which is suited to all the people in that area, rather than just one or a few people. Examples include hazard warnings, cinema programs, local weather, flight delays tourist information, parking and traffic information.

Local tariff - Offering a cheaper tariff when the customer is located in a particular geographical area is a way for mobile operators to take customers from land line operators. The user is notified that the cheaper tariff applies by a message or icon on the phone's display. SMS-CB is used to signal this information to the phone.

An internet server securing a SMS-CB broadcast channel from the Network Operator and offering a continuous stream of encrypted information to the handset, which information can only be read via handsets equipped with the Internet server's client having a specific encryption key. The key can only be switched on by the handset user subscribing to a service.

Multi-page SMS-CB which in some respects is similar to SMS concatenation, makes it possible to assemble up to 15 SMS-CB messages into one long text of up to 15 pages long.

Multi-page SMS-CB may include:

Messages will be stored in the phone's non-volatile memory and ordered according to their topic, based on the SMS-CB types. If the SMS-CB Index is available, the SMS-CB menu will automatically show the names of the topics, otherwise the user will be able to create names for the topics and link them to the code types (e.g. 440=Traffic, 520=Weather 292= Share prices).

The phone will store the most recent message for each of up to 10 topics. The user will be able to consult them on his own time.

SMS image attachment:

The phone's non-volatile memory will be able to store up to 10 images, 5 of which will be pre-programmed in the configuration center. The user can delete them to replace them with his own.

The user will be able to select one of the images to send via SMS, along with a text of at most 25 characters.

Upon reception of a message containing an image, the MMI will signal the message normally. When the user opens the message for reading, the image will be shown along with the text. Among the received message options, the phone will offer a possibility to save the image as a personal image. Of course, any already existing image in the same position in the list will be overwritten when the user selects it (a confirmation screen will offer the user a chance to change his mind).

A non-mandatory, optional feature is to use the image as welcome screen graphics.

The image will be sent in a compressed format so that only 1 SMS is required to send it. It is expected that the maximum image size should be in the range of 30*30 to 35*35 pixels. However the image can be expanded by the client.

The user will have the possibility of defining his own image by combining picture elements chosen in a menu (for example, a list of noses, a list of eyes, a list of mouths, a list of haircuts - the user combines one of each to create a face). This is the so-called "Mister Potato" feature, which could be attractive to the Amuse Me segment.

A plurality of SMS messages can be concatenated into one big message. This message is presented to the user exactly as a normal message. It will be possible to attach larger images, requiring several SMS for sending.

SMS melody attachment in which for example at least 5 personal melodies of 50 notes are made available. The user will be able to use any of the fixed melodies or personal melodies as a ringer for signalling incoming calls.

The user will be able to edit and save each personal melody with a melody editor incorporated in its processor. In addition it will be possible to define a name for the new melody.

The user will be able to select a melody and send it via SMS to another user, either from say a Ringers submenu or as an option in the SendMessage submenu. The melody's name will be transmitted along with the message.

Upon reception of a message containing a melody, the handset will signal the message normally. When the user opens the message for reading, the melody will ring at

the low volume level. Among the received message options, the phone will offer a possibility to save the melody as a personal melody. The user will select the personal melody in the list. Of course, any already existing personal melody in the same position in the list will be overwritten when the user selects it (a confirmation screen will offer the user a chance to change his mind).

A message with an attached melody may also include text and an animated Emotion Icon if the user so chooses. It will be possible to attach both a melody and an image - this will require at least 2 SMS messages for sending.

Another embodiment of the present invention is concerned with personal information services whereby users can subscribe to or pay for services that offer information on a variety of topics (weather, stock market, sports, horoscope, games etc.) via SMS. The SIM toolkit which is in a GSM handset can enable more sophisticated and attractive services to be implemented.

The delivery of subscription services can be effected in several ways, for example, as shown in Figure 12, an internet server 10 can be allocated a channel for its own use and can transmit a continuous subscription services message Cmess to a plurality of SMS enabled phones 20. As shown in Figure 13 the continuous subscription service message Cmess comprises repeating sequences SEQ(n), SEQ(n + 1), SEQ(n+2) of concatenated packets P1 to P8 of information and commands, each of the packets P1 to P8 in a sequence being allocated to a particular topic such as sport, weather, stock exchange

prices and so on. Each packet has up to 93 characters. The packets are stored in respective areas of the phone's memory for later recall as required by the user.

Figure 13 shows a variant of the system shown in Figure 12 which is termed SMS-CB (Short Message Service-Cell Broadcast). SMS-CB is a facility to enable a SMS-CB broadcast packet to be enabled as a transport medium for multiple concurrent services which are delivered in encrypted form to a phone 20 by way of a specific SMS-CB channel. This variant exploits the cellular structure of the GSM network in which an overall geographical area is divided into a plurality of smaller radio coverage areas which for convenience of description are termed cells C1, C2, C3. Each of these cells includes at least one base station transceiver 26A, 26B and 26C which define the extent of the radio coverage area. For convenience of illustration each cell is shown as a hexagon but in reality the actual shape is dependent on the topology of the area. The base station transceivers 26A, 26B, 26C are coupled by landline, optical fibre or high frequency radio link to the mobile switching centre(MSC) 24 of a GSM network. Within each cell, the SMS enabled phones 20 are allowed to roam whilst maintaining contact with their respective base station transceiver 26A, 26B, 26C by way of a selected SMS-CB channel on which the service is being broadcast.

In a manner similar to Figure 12, each base station transceiver 26A, 26B, 26C has a SMS-CB channel allocated for its own use and can transmit a continuous subscription service message Cmess of the type described

with reference to, and as shown in, Figure 13. Thus, each of the base station transceivers is able to deliver an encrypted content stream. More particularly the services content stream is created in SMS-CB format on the internet server 10 in encrypted form. The content stream comprises a plurality of packets, each of which contain different subjects, such as sport, news, weather, and so on, supplied by information content suppliers 14A to 14E (Figure 14).

One way of offsetting the cost of subscription services would be to provide advertising which would be carried as at least one packet, say the packet P8, in each of the repeating sequences SEQ(n), SEQ(n + 1), SEQ(n + 2) of concatenated packets P1 to P8. Thus a subscriber having an SMS enabled client phone 20 would periodically receive advertisements in a manner similar to satellite television. As similar principle may be used to carry local news, local road traffic information or emergency messages. A phone 20 not having the client software does not see the messages. A phone not subscribing to the services can be sent a message inviting them to subscribe.

In the present specification and claims the word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. Further, the word "comprising" does not exclude the presence of other elements or steps than those listed.

From reading the present disclosure, other modifications will be apparent to persons skilled in the

art. Such modifications may involve other features which are already known in the design, manufacture and use of internet servers and component parts therefor and which may be used instead of or in addition to features already described herein. Although claims have been formulated in this application to particular combinations of features, it should be understood that the scope of the disclosure of the present application also includes any novel feature or any novel combination of features disclosed herein either explicitly or implicitly or any generalisation thereof, whether or not it relates to the same invention as presently claimed in any claim and whether or not it mitigates any or all of the same technical problems as does the present invention. The applicants hereby give notice that new claims may be formulated to such features and/or combinations of such features during the prosecution of the present application or of any further application derived therefrom.

CLAIMS

1. A method of delivering information services to a user device having a client, including delivering the information services to the user device as message packets containing commands and the client parsing the commands and using them to condition the user device.

2. A method according to claim 1 wherein the user device is a mobile phone.

3. A method as claimed in Claim 1 or 2, wherein the information services are delivered as Short Message Service (SMS) packet messages, and in that the user device is SMS enabled to receive the SMS messages.

4. A method according to claim 3 wherein the SMS packet message includes a data header and a data field for containing SMS message text and wherein the commands are included in the data header.

5. A method as claimed in claim 3, wherein the information services are delivered as encrypted SMS packet messages.

6. A method as claimed in Claim 1 or 2, wherein the information services are delivered as a General Packet Radio Service (GPRS) packet messages, and in that the user device is GPRS enabled to receive the GPRS packet messages.

7. A method as claimed in Claim 1 or 2 wherein the information services are delivered as a Universal Mobile Telephone Service (UMTS) packet messages, and in that the user device is UMTS enabled to receive the UMTS packet messages.

8. A method as claimed in Claim 1 or 2 wherein the user device includes a Wireless Applications protocol (WAP) browser, wherein a parsed command instructs the user device to become WAP enabled and to establish a data connection with a WAP server which in response to a data connection becoming established delivers the information services by wireless applications protocol (WAP).

9. A method according to any one of the above claims wherein each command includes information data which is to be used to condition the user device and command data which determines how the client uses the information data to condition the user device.

10. A method according to claim 9 wherein the information data is graphical data, animation data, sound data, or text data.

11. A method according to claim 9 wherein the information service provides a media event in the form of a plurality of information data types which are to be played/displayed simultaneously by the user device and wherein each information data type is delivered to the user device in one or more commands included in a message packet and the information data in each command is played/displayed simultaneously with the information data of the other commands which are part of the same media event.

12. A method according to claim 11 wherein the media event includes at least two of the information data types mentioned in claim 10.

13. A method according to claim 11 or 12 wherein the command data in each respective command informs the client that the information data in that command is to be played/ displayed simultaneously with the information data of the other commands which are part of the same media event.

14. A method according to any one of claims 9-13 wherein the command data causes the client to store the information data on the user device.

15. A method according to any one of claims 9-14 wherein the command data causes the information data to be displayed on the user device.

16. A method according to claim 9 wherein the information data is animation data and the command data causes an animation to be played on the user device.

17. A method according to claim 10 wherein the information data is sound data and the command data causes the sound data to be played on a sound emitting device which is integrated with or coupled to the user device.

18. A method according to any one of claims 9-17 wherein the command data causes the information data to be both stored and played or displayed on the user device.

19. A method according to any one of claims 9-18 wherein the command data causes the user device to reply

to the information service provider by transmitting a message in reply.

20. A method according to claim 19 wherein the message transmitted in reply is in one of the following formats: SMS, GPRS, UTMS or WAP.

21. A method according to claim 19 or 20 wherein the command data causes the client to prompt an input from the user of the user device and data relating to the input is included in the message transmitted in reply.

22. A method according to claim 21 wherein the prompt is a list of options, the user of the user devices selects one of these options and the message sent in reply indicates which of the options was selected by the user.

23. A method according to any one of claims 9-22 wherein the command data includes one or more command flags, each command flag having an ``on'' state and an ``off'' state, when the command flag is in an ``on'' state the client uses the information data to condition the user device in a way determined by the command flag and when the command flag is in an ``off'' state the client does not use the information data to condition the user device in this way.

24. A method according to claim 23 wherein one of the command flags is a display command flag which when in its on state causes the user data to be displayed or played by the user device.

25. A method according to claim 23 wherein one of the command flags is a store command flag which when in its on state causes the user data to be stored by the user device.

26. A method according to claim 23 wherein one of the command flags is a reply command flag which, when in its on state, causes the user device to send a message in reply to the information service provider.

27. A method according to claim 23 wherein the command data includes display, store and reply command flags as defined in claims 24, 25 and 26 respectively.

28. A method according to any one of claims 23-27 wherein the client changes a command flag from its ``on'' state to its ``off'' state once the client has caused the information data to be used in the manner dictated by the command flag.

29. A method according to any one of the above claims wherein the commands are compressed before being delivered to the user device.

30. A method according to any one of the above claims wherein several commands are concatenated together in the same message packet.

31. A method according to any one of the above claims wherein the message packet is encrypted before being delivered to the user device.

32. A method according to any one of the previous claims wherein a command extends over several message packets which have been concatenated together.

33. A method according to any one of the previous claims wherein the message packet or packets are generated by an information service provider.

34. A method according to any one of the previous claims wherein the message packet or packets are sent from an Short Message Service Centre.

35. A method according to any one of the previous claims wherein the message packet or packets are sent from a first user device to a second user device.

36. A user device for use in a system in which a packet message signal including commands is generated and propagated from an information service provider to the user device, the user device including means for receiving the packet message signal and a client having means for extracting the commands from the packet message signal, means for parsing commands present in the packet message signal and means for conditioning the user device in response to the parsed commands.

37. A user device according to claim 36 wherein the packet message signal is an SMS packet message signal and the user device is SMS enabled.

38. A user device according to claim 37 wherein the SMS packet message signal includes a data header and a data field for containing SMS message text and wherein the commands are embedded in the data header.

39. A user device according to any one of claims 36 to 38 wherein the command includes command data and information data and the client includes means for detecting the command data and conditioning the device in accordance with the command data.

40. A user device according to claim 39 wherein the command data indicates that the information data should be stored, displayed or played and wherein the client has means for causing the information data to be played, displayed and/or stored on the user device.

41. A user device according to any one of claims 36 to 40 wherein the user device is a mobile phone.

42. A user device according to any one of claims 36 to 41 wherein the user device includes a Wireless Applications Protocol (WAP) browser which is responsive to a command in the packet message signal to establish a data connection with a WAP server.

43. A user device according to any one of claims 36 to 43 wherein the client is embedded in the user device.

44. A user device according to any one of claims 36 to 43 wherein the client is embedded in a device which is mechanically and electrically connectable to the user device.

45. A user device according to any one of claims 39 to 45 wherein the command includes information type data indicating the type of information data included in the command and wherein the client has a plurality of parsing means for parsing commands, each respective parsing means being for a different information data type and means for detecting the information data type of a command and sending it to the appropriate parser.

46. A user device according to any one of claims 36 to 45 wherein the client has means for detecting that a series of commands are to be executed simultaneously and means for ensuring that the commands are executed simultaneously.

47. A user device according to any one of claims 36 to 46 wherein the client has means for concatenating a series of commands extracted from a received message packet signal before the client parses the commands.

48. A user device according to any one of claims 36 to 47 wherein the client has means for concatenating together a series of received message packet signals and parsing a command or commands received in said series of message packet signals.

49. A user device according to any one of claims 36 to 48 which is capable of concatenating together a series of commands, formatting the commands for conditioning a receiving user device into one or more message packets and transmitting the message packet(s) to another user device.

50. A user device according to any one of claims 39 to 49 wherein the client includes means for prompting user input in response to a command and means for sending a reply to the information service provider based upon the user input.

51. An information message delivery system including an information providing means for generating packet

message signals including commands, packet message signal propagating means coupled to the information providing means, and a user device according to any one of claims 36 to 51.

52. A system as claimed in Claim 51, wherein the packet message signal propagating means includes means for formatting the messages as Short Message Service (SMS) packet messages and in that the user device comprises a SMS enabled phone.

53. A packet message signal generated by an information service provider or a user device, the signal including commands for use by a client in a receiving user device for conditioning the user device.

54. A signal as claimed in claim 53, wherein the signal comprises byte stream data packet messages.

55. A method of delivering information services, substantially as hereinbefore described.

56. An information message delivery system constructed and arranged to operate substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

57. A user device constructed and arranged to operate substantially as hereinbefore described.

58. A packet message signal substantially as hereinbefore described.

59. A method according to any one of the above method claims wherein information services are delivered to a plurality of subscribing user devices as a stream of encrypted message packets and the subscribing user devices decrypt the encrypted message packets and store them for subsequent display.

60. A method according to claim 59 wherein the encrypted message packets comprise repeating sequences of concatenated packets.

61. A method as claimed in claim 60 characterised in that each packet of a sequence carries information relating to one topic.

62. A method as claimed in claim 60 or 61 characterised in that correspondingly located packets in each sequence relate to the same topic.

63. A method as claimed in claim 60, 61 or 62 characterised in that at least one packet of a sequence comprises advertising.

64. A method as claimed in any one of claims 59-63, characterised in that the messages are transmitted as SMS (Short Message Service) cell broadcast messages.

65. A method as claimed in claim 64, characterised in that at least one packet of a SMS cell broadcast

comprises information relating to or about the cell in which the transmission is made.

66. An information delivery system according to claim 51, the information delivery system including an information server coupled to at least one information content provider and to a message transmission means for transmitting information provided by the information server as a stream of encrypted message/packets and a plurality of user devices, each user device including a client for decrypting the encrypted messages, a memory for storing the decrypted messages and a message display means.

67. A system as claimed in claim 66, wherein a plurality of information content providers are coupled to the information server, the information server having means for formatting information selected from predetermined ones of the plurality of information content providers into a sequence of concatenated packets.

68. A user device for use in an information delivery system according to claim 60, the user device comprising means for receiving the stream of encrypted messages, a client for decrypting the encrypted messages, a memory for storing the decrypted messages and a message display means for displaying the information contained in a message.

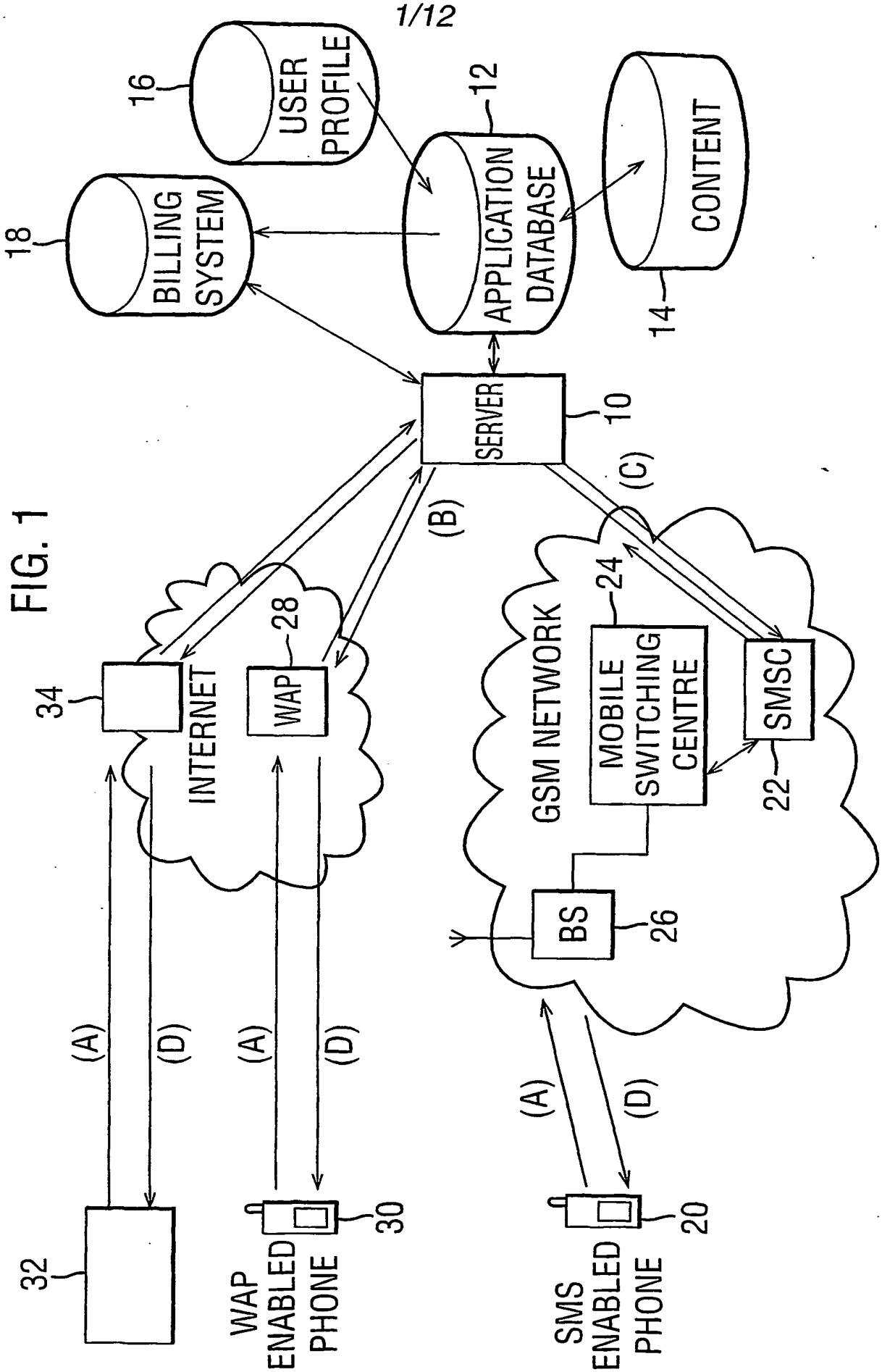

USER PROFILE
16
BILLING SYSTEM
18
APPLICATION DATABASE
12
CONTENT
14
SERVER
10
(B)
(C)
INTERNET
34
WAP
28
GSM NETWORK
24
MOBILE SWITCHING CENTRE
SMSC
22
BS
26
(A)
(D)
(A)
(D)
(A)
(D)
32
WAP ENABLED PHONE
30
SMS ENABLED PHONE
20

FIG. 1

FIG. 2

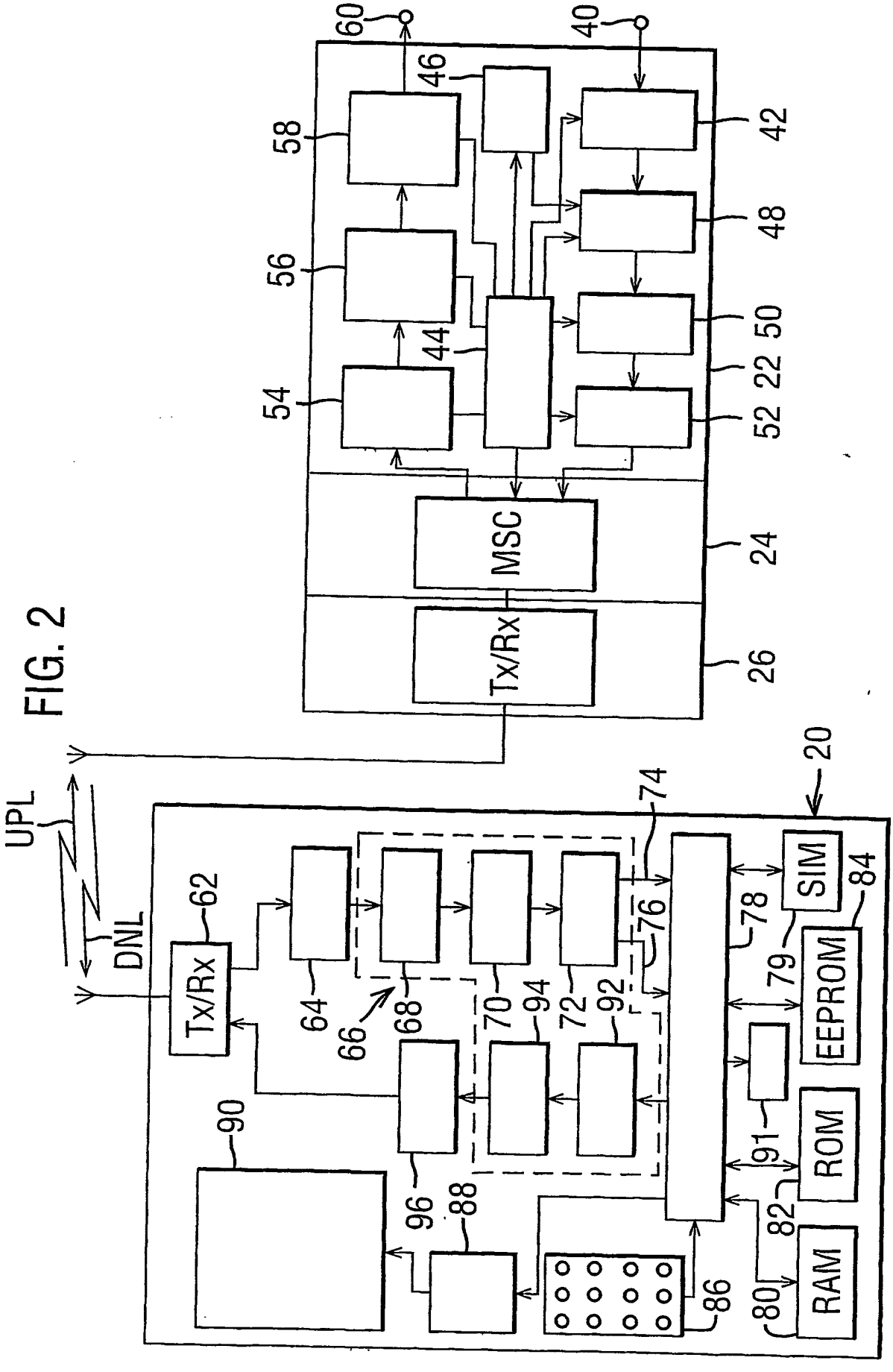
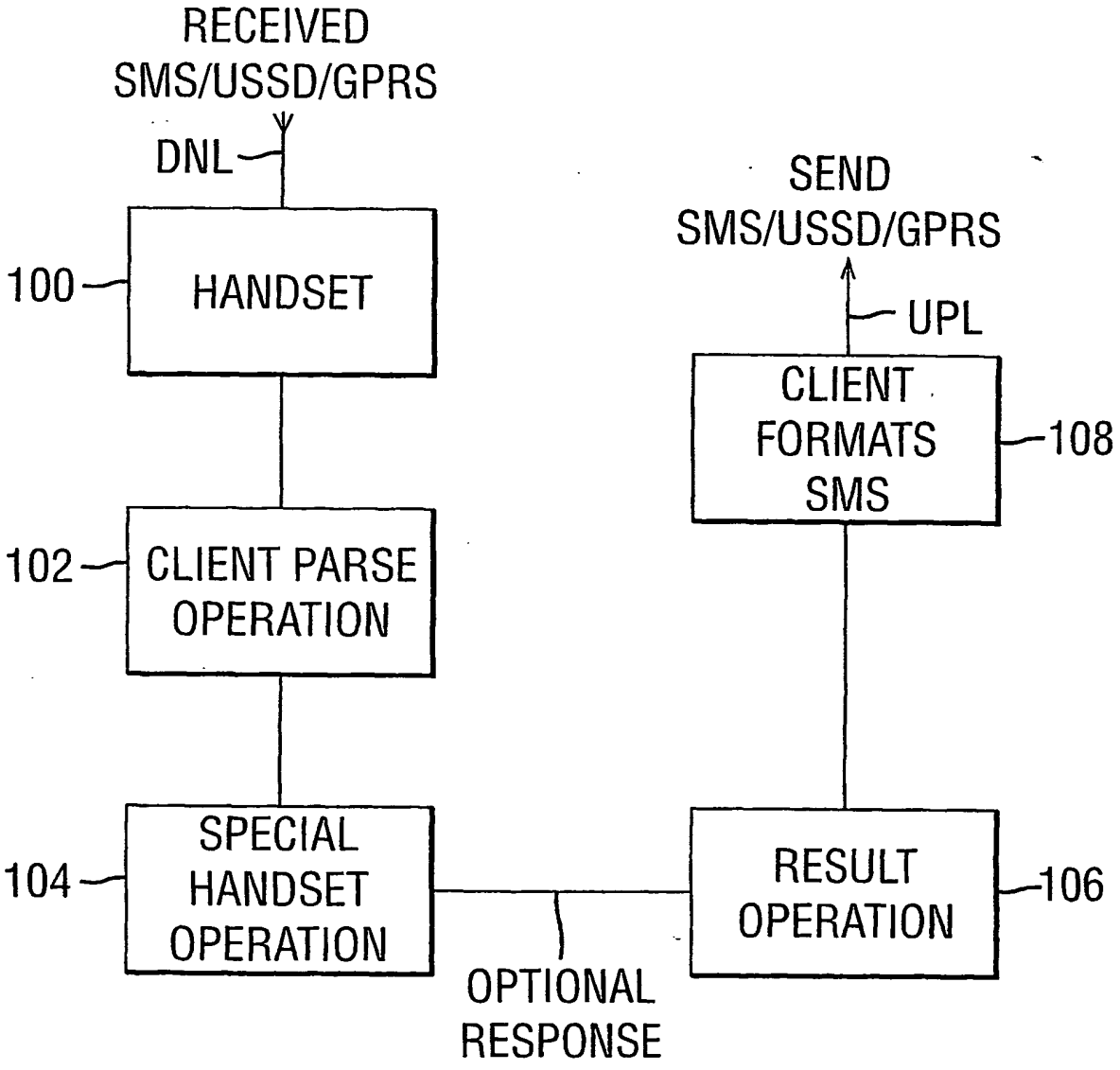

60
40
46
58
42
48
56
44
50
22
54
52
MSC
24
Tx/Rx
26
UPL
DNL
20
74
62
Tx/Rx
64
66
68
70
72
76
78
SIM
84
79
EEPROM
94
92
90
91
ROM
96
88
82
RAM
86
80

FIG. 3


RECEIVED
SMS/USSD/GPRS
DNL
100
HANDSET
102
CLIENT PARSE
OPERATION
104
SPECIAL
HANDSET
OPERATION
OPTIONAL
RESPONSE
SEND
SMS/USSD/GPRS
UPL
CLIENT
FORMATS
SMS
108
RESULT
OPERATION
106

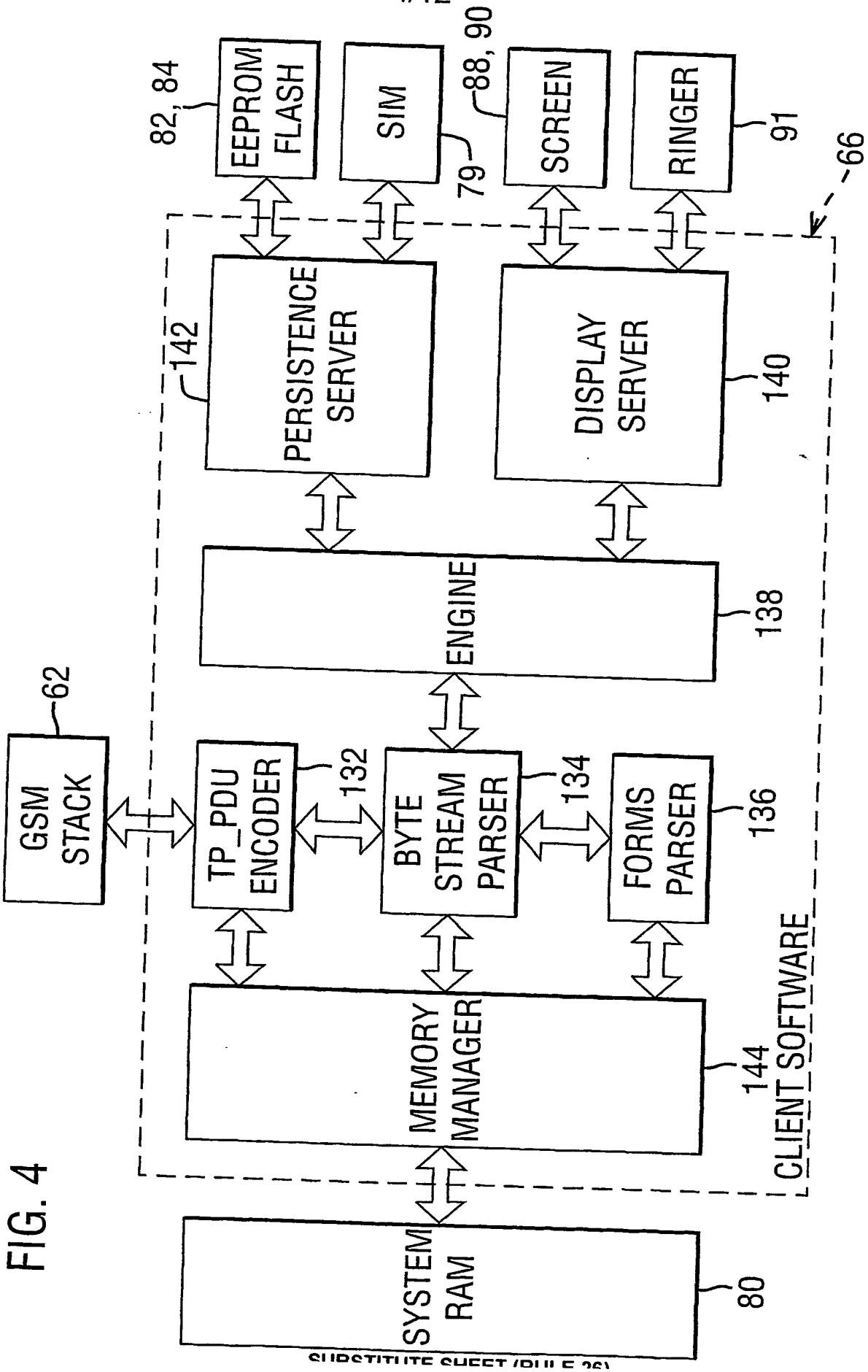

82, 84
EEPROM FLASH
SIM
79
88, 90
SCREEN
RINGER
91
66
142
PERSISTENCE SERVER
DISPLAY SERVER
140
ENGINE
138
62
GSM STACK
TP_PDU ENCODER
132
BYTE STREAM PARSER
134
FORMS PARSER
136
MEMORY MANAGER
144
CLIENT SOFTWARE
SYSTEM RAM
80

FIG. 4

FIG. 5

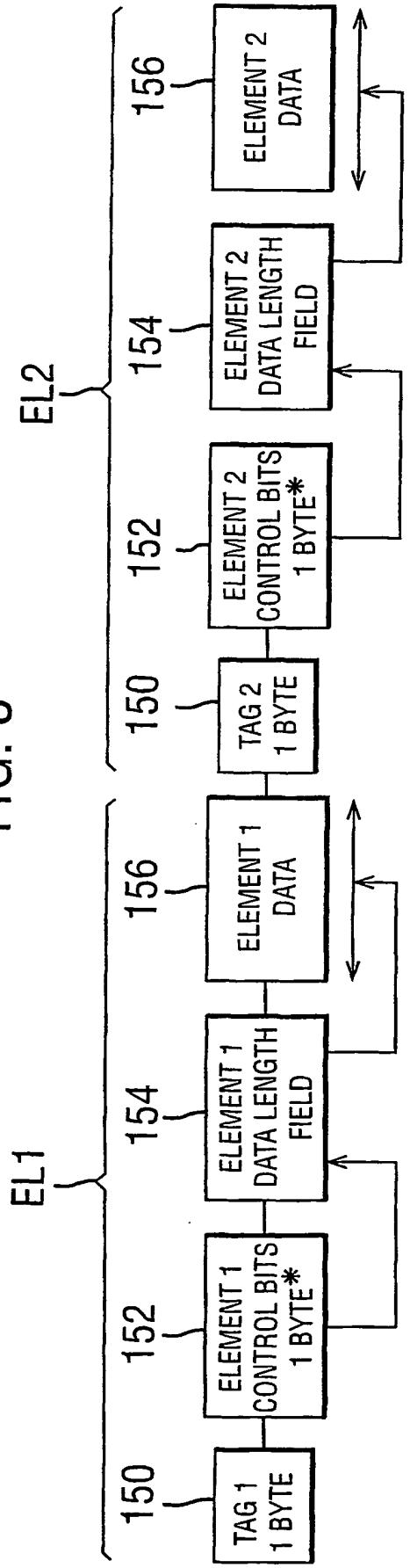

EL1
EL2
150
152
154
156
TAG 1
1 BYTE
ELEMENT 1
CONTROL BITS
1 BYTE*
ELEMENT 1
DATA LENGTH
FIELD
ELEMENT 1
DATA
TAG 2
1 BYTE
ELEMENT 2
CONTROL BITS
1 BYTE*
ELEMENT 2
DATA LENGTH
FIELD
ELEMENT 2
DATA
* MINIMUM 1 BYTE

FIG. 6

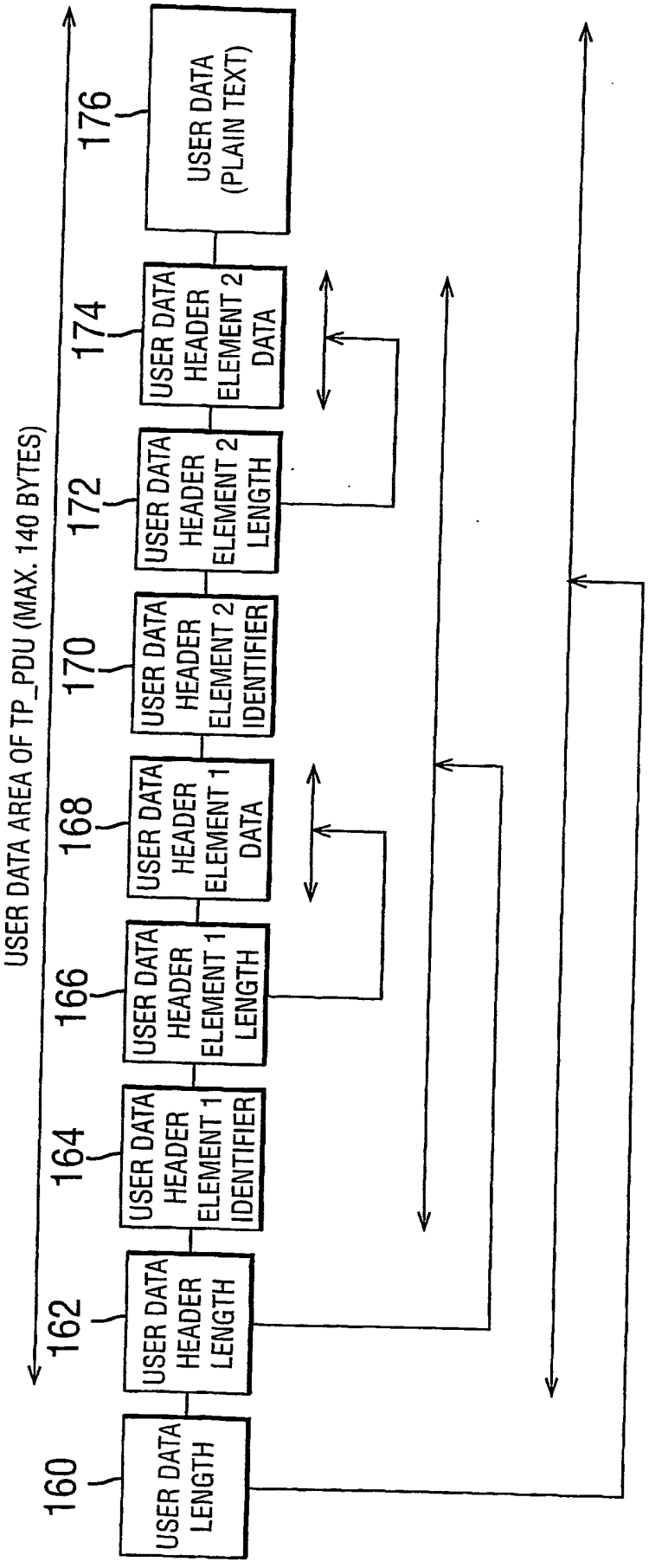
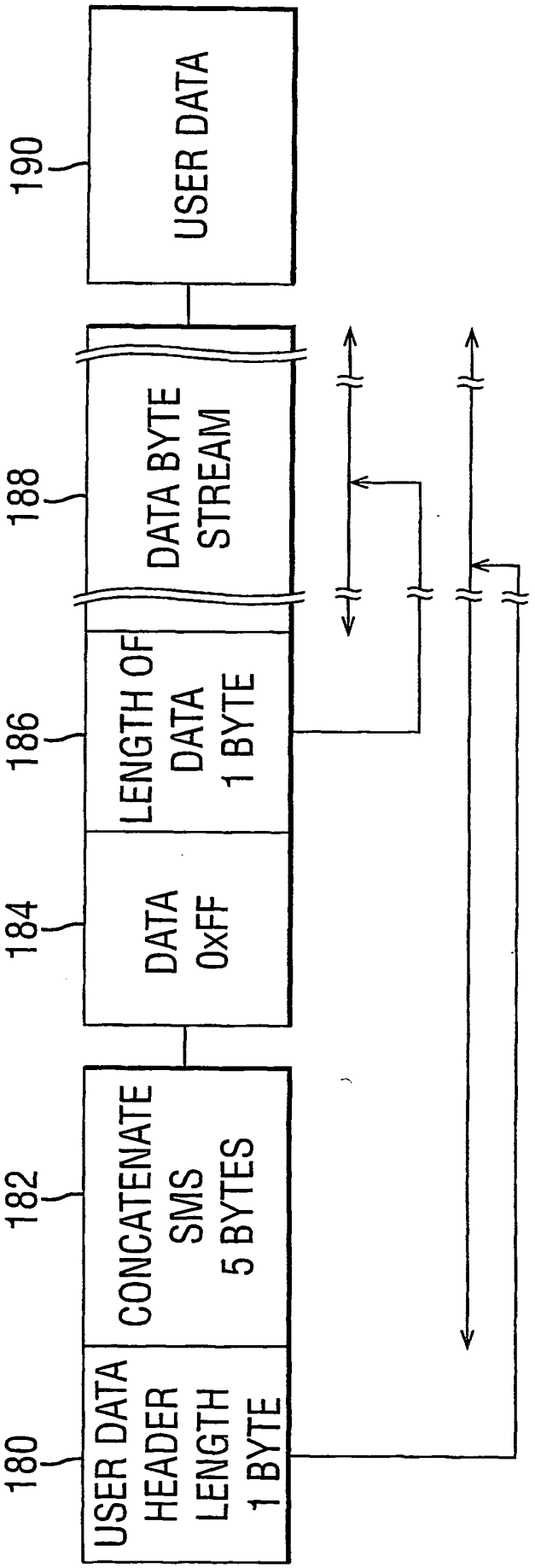

USER DATA AREA OF TP_PDU (MAX. 140 BYTES)
160
USER DATA LENGTH
162
USER DATA HEADER LENGTH
164
USER DATA HEADER ELEMENT 1 IDENTIFIER
166
USER DATA HEADER ELEMENT 1 LENGTH
168
USER DATA HEADER ELEMENT 1 DATA
170
USER DATA HEADER ELEMENT 2 IDENTIFIER
172
USER DATA HEADER ELEMENT 2 LENGTH
174
USER DATA HEADER ELEMENT 2 DATA
176
USER DATA (PLAIN TEXT)

FIG. 7


USER DATA HEADER LENGTH 1 BYTE
180
CONCATENATE SMS 5 BYTES
182
DATA 0xFF
184
LENGTH OF DATA 1 BYTE
186
DATA BYTE STREAM
188
USER DATA
190

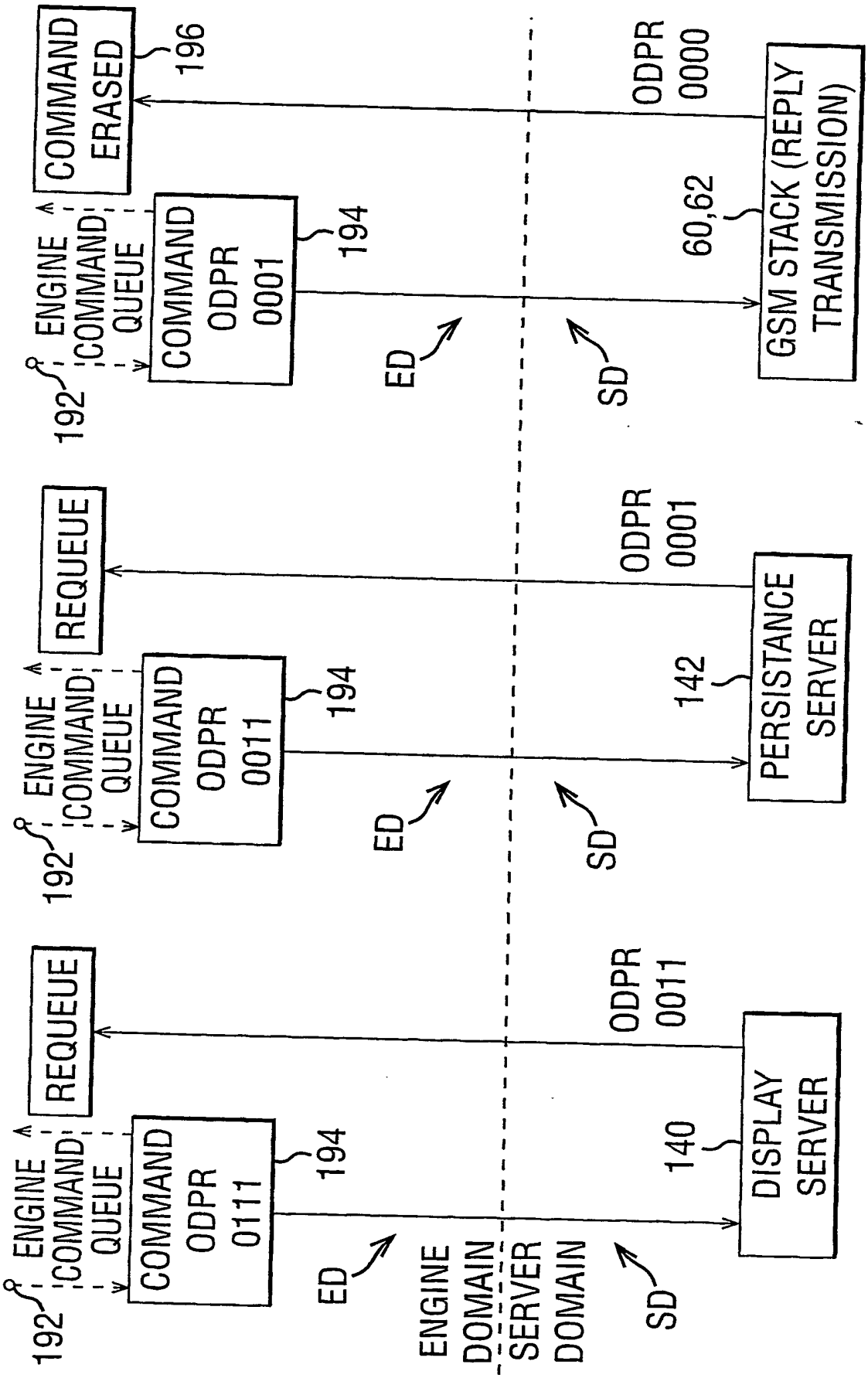


FIG. 8A

FIG. 8B

FIG. 8C

FIG. 9

EMBEDDED FORMS LANGUAGE
CUSTOM SMS/USSD/GPRS
FORMAT COMMANDS

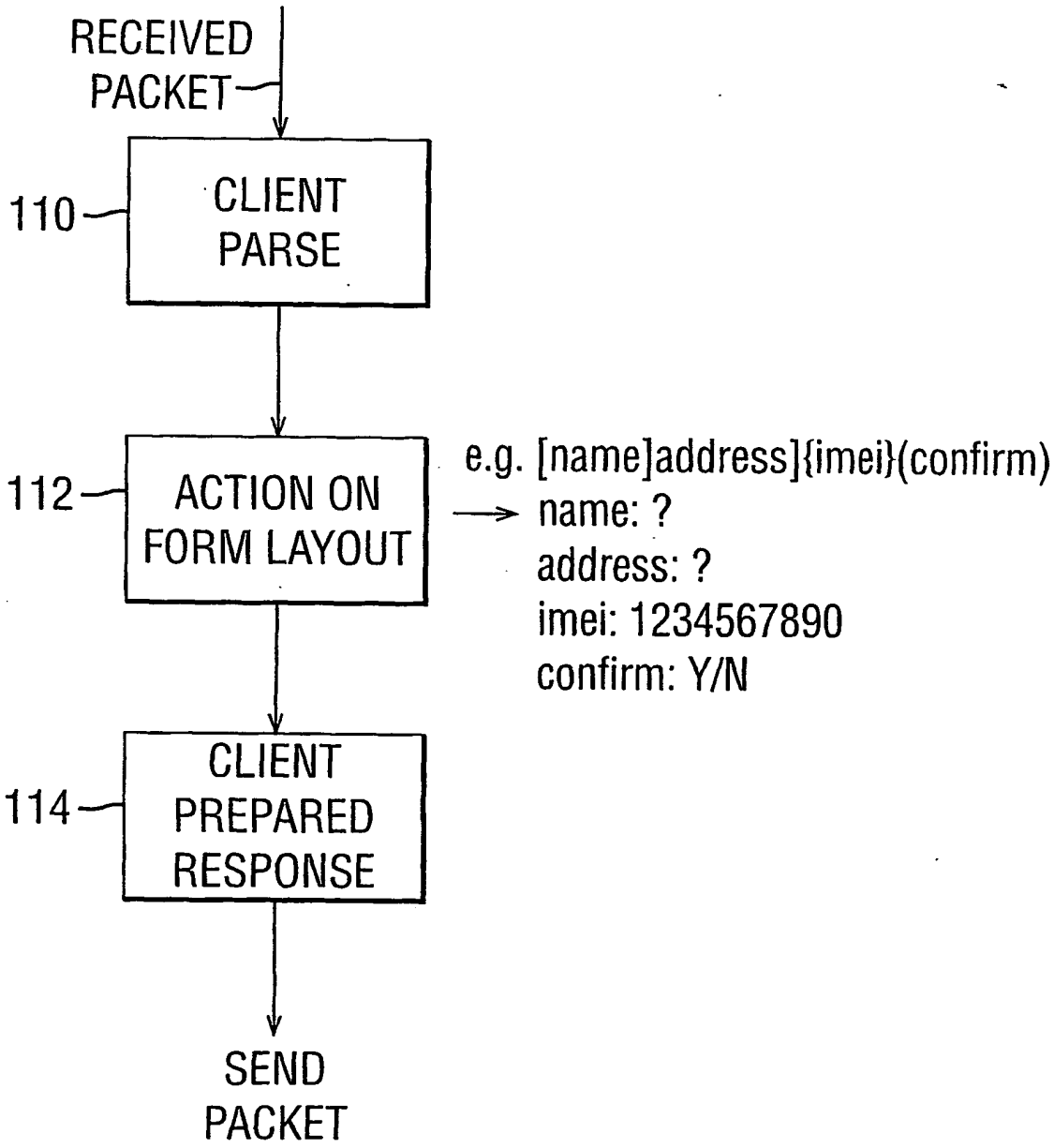


FIG. 10

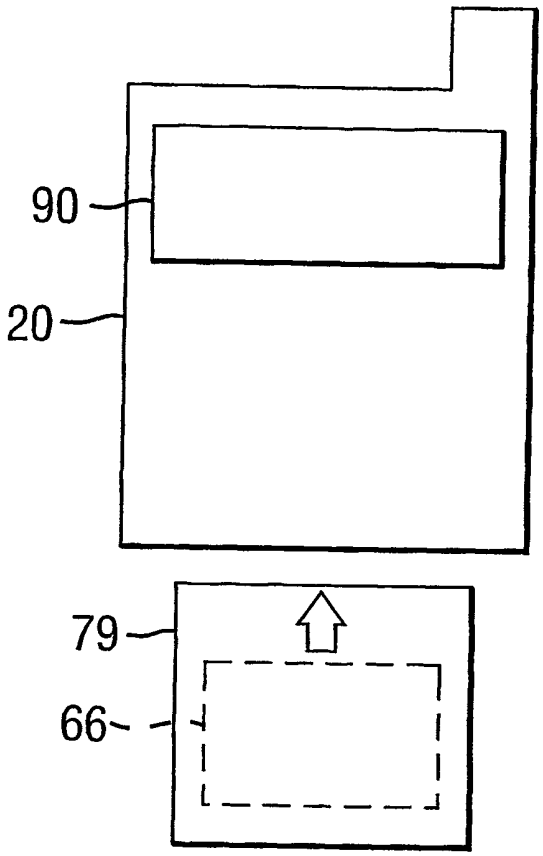


FIG. 11

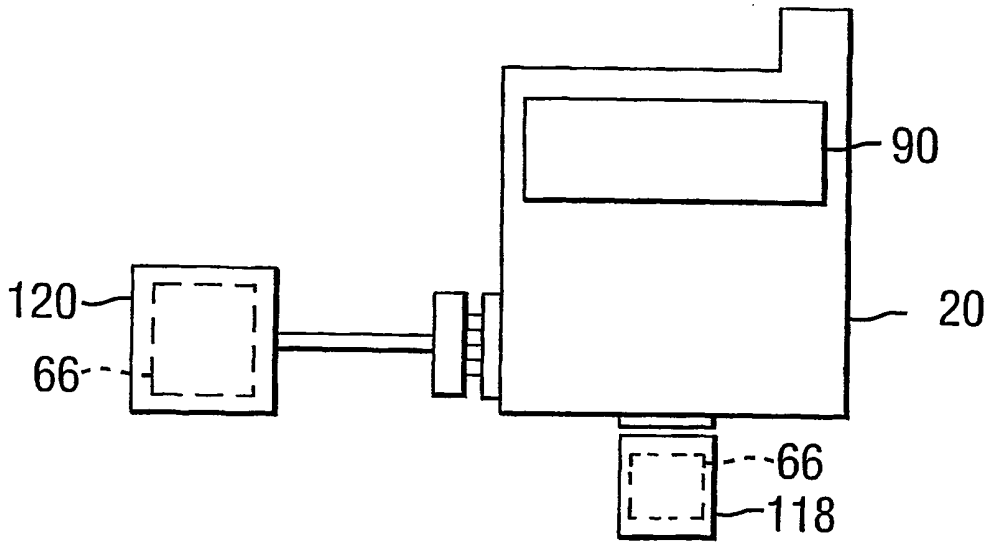


FIG. 12

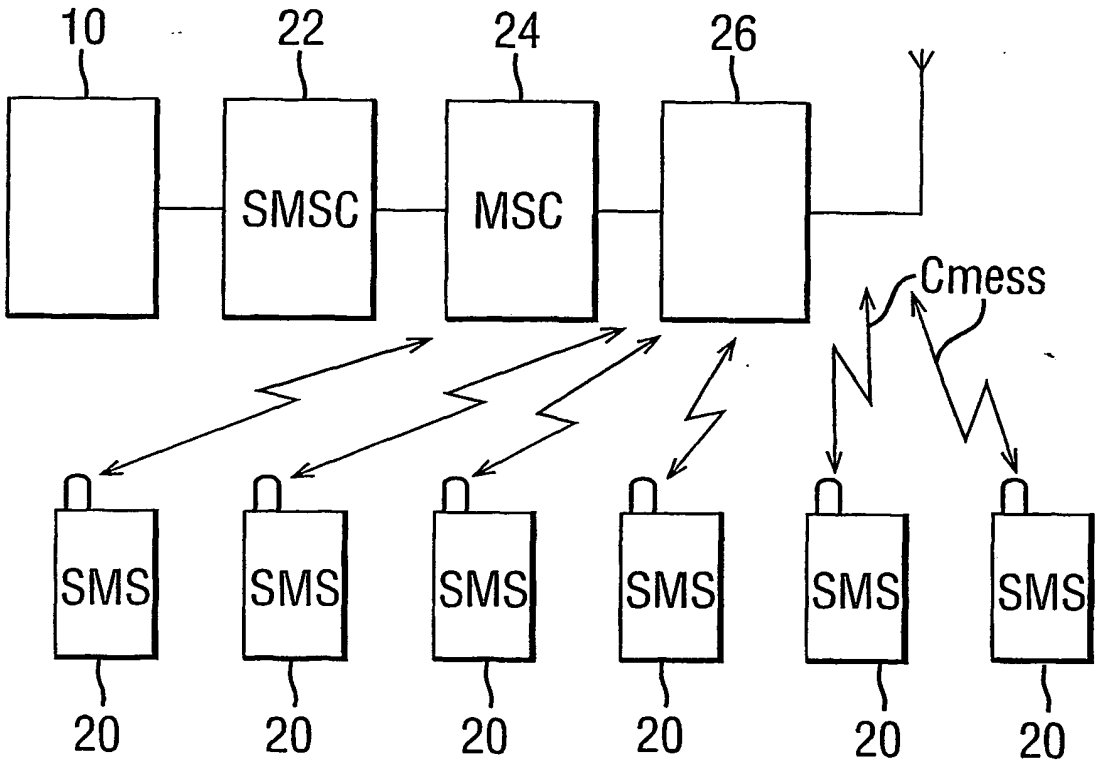

10
22
24
26
SMSC
MSC
Cmess
SMS
SMS
SMS
SMS
SMS
SMS
20
20
20
20
20
20

FIG. 13

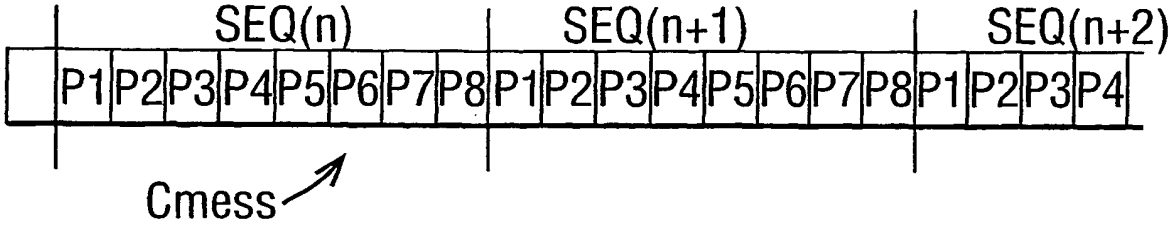

SEQ(n)
SEQ(n+1)
SEQ(n+2)
P1 P2 P3 P4 P5 P6 P7 P8 P1 P2 P3 P4 P5 P6 P7 P8 P1 P2 P3 P4
Cmess

FIG. 14

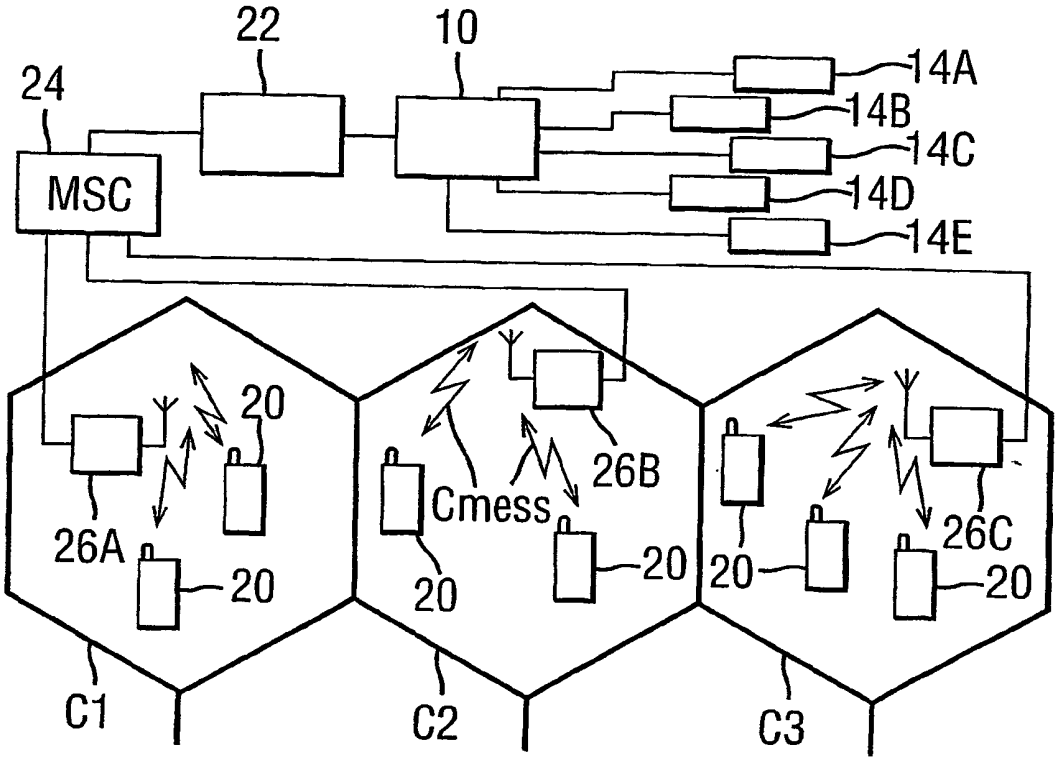
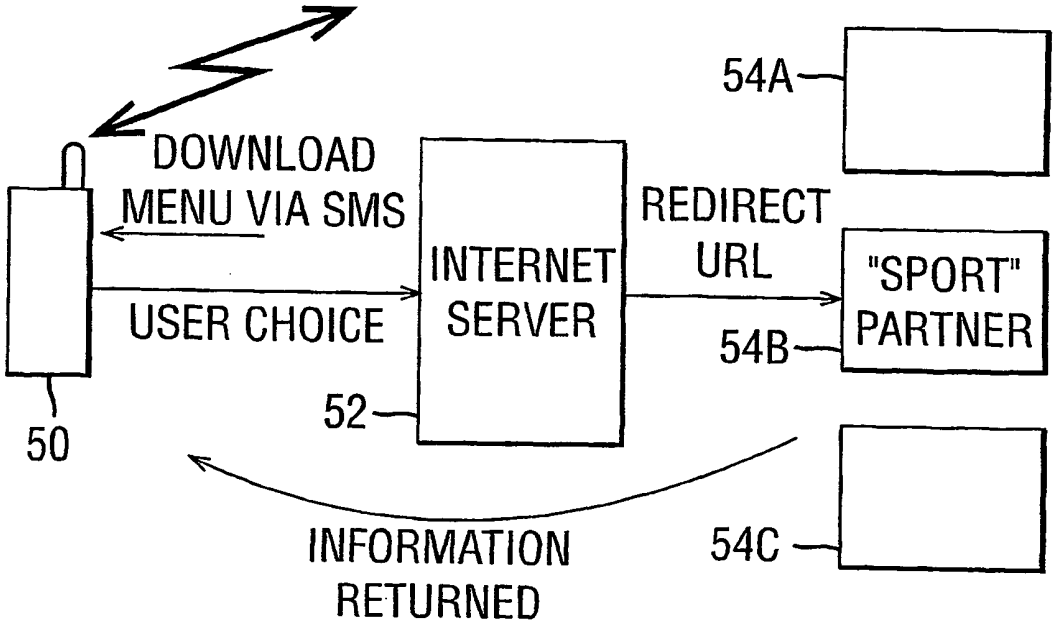


FIG. 15

TEXT TAGGING KEY WORDS TO SPECIFIC DELIVERY SERVICE ALLIANCE



INTERNATIONAL SEARCH REPORT

Inter d Application No
PCT/GB 01/01237

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04Q7/22 H04L12/28 H04L29/06 H04L12/56

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04Q H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, COMPENDEX, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 34422 A (NOKIA MOBILE PHONES LTD ;HUBER ROLF (FI); WELLS MARK (US)) 6 August 1998 (1998-08-06)	1-3,5, 9-19, 21-37, 39-41, 43-63
Y	page 3, line 3 -page 6, line 6 page 8, line 1 -page 8, line 6 page 14, line 5 -page 14, line 30 page 16, line 10 -page 32, line 15 figures 1-4	4,6-8, 38,42
X	WO 97 32439 A (DECKER PETER ;KAARTINEN KALEVI (DE); GUSTAFSSON PATRIK (FI); NOKIA) 4 September 1997 (1997-09-04)	1,36,51
Y	page 2, line 11 -page 2, line 15 figures 1-11	4,6,38

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
21 June 2001	05/07/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax (+31–70) 340–3016	Körbler, G

INTERNATIONAL SEARCH REPORT

Inten al Application No
PCT/GB 01/01237

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 99 66746 A (NOKIA TELECOMMUNICATIONS OY ;HAUMONT SERGE (FI); HEINO MIKKO (FI);) 23 December 1999 (1999-12-23) page 2, line 10 -page 3, line 25 page 8, line 8 -page 8, line 24 page 9, line 30 -page 9, line 32 page 13, line 10 -page 17, line 32	7
Y	WO 99 56431 A (HANSEN HANS H H ;HANSEN LARS BOHN (DK); NOKIA MOBILE PHONES LTD (F) 4 November 1999 (1999-11-04) abstract	8,42

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Inter Application No
PCT/GB 01/01237

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